Contents

Preface vii

Electron-vibration effects in $Cs_2GeF_6:Mn^{4+}$ using two-photon absorption
C. Campochiaro, C.D. Flint, Z. Hasan, G. Hollingsworth and D.S. McClure 1

Studies of far infrared generated nonequilibrium phonons
W.M. Dennis 5

Excited state lattice dynamics
M. Dominoni and N. Terzi 11

Relaxation of terahertz phonons in mixed crystals exhibiting glass-like properties
W.W. Fischer, K.F. Renk, J.A. Campbell and U. Happek 14

Relaxation of the SH vibrational stretch mode in As_2S_3 glass
U. Happek, J.R. Engholm and A.J. Sievers 17

Zeeman spectroscopy of H^- local modes in rare-earth doped CaF_2
G.D. Jones 20

Localized anharmonic defect modes in a one-dimensional lattice with standard two-body nearest-neighbor potentials
S.A. Kiselev, S.R. Bickham and A.J. Sievers 23

Vibronic transitions of rare earth ions
A. Meijerink, C. de Mello Donegá, A. Ellens, J. Sytsma and G. Blasse 26

Ultrafast relaxation of the fundamental vibrations of SH^- and OH^- in potassium halides
C.E. Mungan, U. Happek and A.J. Sievers 33

Localized vibrational modes in perfect crystals
A.J. Sievers, S.A. Kiselev and S.R. Bickham 37

Vibron states dynamics in molecular alloys
C. Turc, R. Ouillon, B. Perrin, P. Ranson and J.P. Lemaistre 43

On a class of squeezed excited states in exciton–phonon and Jahn–Teller systems ("exotic states")
H. Eiermann, M. Sonnek and M. Wagner 47

A Fulton–Gouterman view to the exciton–phonon ground state: contrast of anti-squeezing and reflection in Q space
Th. Frank, M. Sonnek and M. Wagner 51

On the role of local vibrational modes in excimer formation
T.-M. Wu, D.W. Brown and K. Lindenberg 54

Robustness of the single dressing fraction characterization of polaron structure in multi-mode partial dressing theory
Y. Zhao and D.W. Brown 61

Resonant short-pulse effects on nuclear motion in the electronic ground state
T.J. Smith, L.W. Ungar and J.A. Cina 66

Coherent transients of localized triplet states in diamond
M. Glasbeek, I. Hiromitsu and J. Westra. 74

Dynamical polariton concept for exciton absorption process in semiconductors
T. Itoh, H. Tsuchi and T. Ikehara 78

Quantum beats in monoclinic ZnP_2 crystals
T. Mishina and Y. Masumoto 82

Density matrix theory of dissipative wave packet dynamics
M. Schreiber, O. Kühn and V. May. 85

Short time semiclassical dynamics of optical processes in condensed phases
L.W. Ungar and J.A. Cina 89

Nonlocal aspects of the optical responses of mesoscopic systems
K. Cho, H. Ishihara and Y. Ohfuti 95

Anisotropic energy transfer and dynamical behavior of excitons in a layered BiI_3 crystal
T. Kawai, M. Ichida, T. Karasawa and T. Komatsu 100

How different are Frenkel and Wannier excitons? $\chi^{(3)}(-\omega; \omega, -\omega, \omega)$ versus the α scaling law
J.-i. Inoue and E. Hanamura 103

Pump-probe spectroscopy of J-aggregates: a way to measure intermolecular correlations in the frequency disorder
J. Knoester 107

Ultrafast spectroscopy of PICBr J aggregates: the dynamics of large coherence length exciton
S. Kobayashi and F. Sasaki. 113

Geometrical relaxation in polydiacetylene by pump–pump–probe femtosecond Raman gain spectroscopy
T. Kobayashi 117

Reduced exciton–exciton scattering in quantum wires
M. Oestreich, W.W. Rühle, H. Lage, D. Heitmann and K. Ploog 120

Picosecond spectroscopy of plastically deformed GaAs
M. Oestreich, W.W. Rühle, J. Krüger and H. Alexander. 123

Resonant Raman scattering of PbI_2 microcrystallites in E–MAA copolymer
S. Saito and T. Goto. 127

Relaxation in many-electron systems with disorder and Coulomb interaction
M. Schreiber and K. Tenelsen 130

Lattice relaxation of photoexcited states in conjugated polymers
Y. Shimoi and S. Abe 134

Quantization of exciton in ultrathin CuCl epitaxial films
Z.K. Tang, A. Yanase, T. Yasui and Y. Segawa 138

Polarons in quantum wells: two-dimensional structures
A. Thilagam and J. Singh 142

Time-resolved luminescence study of self-trapped exciton relaxation in ordered and disordered one-dimensional MX-chain systems
Y. Wada, U. Lemmer, E.O. Göbel and M. Yamashita 146

Spectral hole burning in pigment–protein complexes of photosynthetic bacteria
C. De Caro, R.W. Visschers, R. van Grondelle and S. Völker 149

Optical dephasing and excited state dynamics in photosynthetic pigment–protein complexes
R.J.W. Louwe and T.J. Aartsma 154

Transient hole burning in N–V centre in diamond
N.B. Manson and C. Wei 158

Vibronic spectroscopy of single molecules: exploring electronic-vibrational frequency correlations within an inhomogeneous distribution
A.B. Myers, P. Tchénio and W.E. Moerner 161

Electron–phonon coupling in the B820 subunit form of LH1 studied by temperature dependence of optical spectra
T. Pullerits, F. van Mourik, R. Monshouwer, R.W. Visschers and R. van Grondelle 168

Fluorescence properties of Zn-substituted myoglobin
H. Murakami and T. Kushida 172

Stark swept transient hole-burning and excited state dynamics in $[Ru(bpy)_3]^{2+}$
H. Riesen and E. Krausz 176

Temperature dependence of optical line widths and specific heat of rare-earth-doped silicate glasses
Th. Schmidt, J. Baak, D.A. van de Straat, H. Brom and S. Völker 180

Homogeneous line width of Praseodymium ions in various inorganic materials
T. Okuno, K. Tanaka, K. Koyama, M. Namiki and T. Suemoto 184

Long-time spectral diffusion in $LaF_3:Pr^{3+}$
M.J. Sellars, P.T.H. Fisk and N.B. Manson 188

Thermal stability of spectral hole and electron–phonon interaction in donor–acceptor electron transfer system
M. Tian, B. Luo, W. Li, S. Huang and J. Yu 191

Competition between ultrafast energy relaxation and population relaxation in the excited state of β-carotene in solution
J. Watanabe, J. Nakahara and T. Kushida 194

Picosecond luminescence and excitation energy transfer in J- and H-aggregates of cyanine dyes on colloidal silica
M. Watanabe, M. Herren and M. Morita 198

Ultrafast exciton spin relaxation in GaAs/AlGaAs and CdMnTe multiple quantum wells
Y. Takagi, S. Adachi, S. Takeyama, A. Tackeuchi, S. Muto and J.J. Dubowski 202

Dynamics of multiphonon processes in luminescence spectra of oxygen-bound excitons in ZnTe:O
Y. Burki, W. Czaja, V. Capozzi and P. Schwendimann 206

Dynamics of semiconductors with disorder
J.I. Dijkhuis 210

Exciton dynamics in zinc-rich CdZnTe/ZnTe quantum wells
J.F. Donegan, R.P. Stanley, J.P. Doran and J. Hegarty 216

Transient photobleaching in the quantum dot quantum well CdS/HgS/CdS
A. Eychmüller, T. Voßmeyer, A. Mews and H. Weller 223

Intraband optical Stark effect in CdTe
D. Fröhlich, B. Uebbing, T. Willms and R. Zimmermann 227

PL oscillations in $Cd_{1-x}Mn_xTe$
M. Godlewski, A. Suchocki and P.H.M. van Loosdrecht 230

Transient optical reflectivity in layered semiconductors
A. Hasegawa, T. Kuroda, K. Inoue, Y. Mitsumori, F. Minami and K. Era 234

Spontaneous photon echo from the (A^0, X) complex in CdS
R. Heitz, B. Lummer, A. Hoffmann and I. Broser 237

Optical gain in an inhomogeneously broadened exciton system
T. Ishihara, Y. Ikemoto, T. Goto, A. Tsujimura, K. Ohkawa and T. Mitsuyu 241

Transient optical excitation breaks time-reversibility in GaAs and InSb crystals
A. Malinowski, D. Paraschuk, S.V. Popov and N.I. Zheludev 244

Exciton relaxation in MOVPE grown $ZnSe_xTe_{1-x}$ epilayers
A. Naumov, S. Permogorov, W. von der Osten, H. Stolz, H. Stanzl and W. Gebhardt 248

Nonradiative transition rates of Fe^{2+} in III–V and II–VI semiconductors
L. Podlowski, R. Heitz, P. Thurian, A. Hoffmann and I. Broser 252

Phonon-assisted trapping and detrapping of an electron in quantum wells and wires by ionized impurity
Y.M. Sirenko and V. Mitin 257

Nonlinear exciton absorption of ZnCdSe/ZnSSe superlattices in femtosecond time region
T. Tokizaki, H. Sakai, A. Nakamura, Y. Manabe, S. Hayashi and T. Mitsuyu 261

Coherent oscillation of zone-folded phonons in GaAs–AlAs superlattices
A. Yamamoto, T. Mishina, Y. Masumoto and M. Nakayama 265

Measurements of diffusion coefficients and carrier recombination times of PbS and Cu_2O semiconductor clusters by time-delayed four wave mixing with incoherent light
J. Zhao, X. Zhang, F. Zhou, C. Jin, W. Qin, S. Huang, J. Yu, B. Zou, Y. Zhang and L. Xiao . . . 268

Non-Markovian relaxation in semiconductors: an exactly soluble model
R. Zimmermann and J. Wauer 271

Relaxation and photochemistry in pentacene doped benzoic acid crystals
S. Astilean, A. Corval, R. Casalegno and H.P. Trommsdorff 275

Thermal conversion of F_A center relaxed excited states in $KF:Na^+$
G. Baldacchini, M. Cremona, R.M. Montereali, C. Giliberti, A. Scacco, U.M. Grassano and A. Shpak 278

Photoionization, trapping and recombination processes in optically excited $Li_2Ge_7O_{16}$:Cr crystals
S.A. Basun, A.A. Kaplyanskii and S.P. Feofilov 281

Looping mechanism in Yb^{3+}–Tm^{3+}–Ho^{3+} doped $Gd_3Ga_5O_{12}$ garnet
A. Brenier, L.C. Courrol, C. Pédrini, C. Madej and G. Boulon 284

Ultrafast vibrational relaxation of optically excited O_2-centers in KCl and NaCl
A. Bürger, C. Kryschi, L.O. Schwan and D. Schmid 287

Light shifts of sharp lines in RE-doped solids
J.M. Collins and B. Di Bartolo. 290

The relationship between quantum efficiency and average lifetime of Cr^{3+} ions in glass
J. Fernández, R. Balda, M.A. Illarramendi and G.F. Imbusch 294

Excited-state dynamics of Pr^{3+}:$LaCl_3$
J. Ganem, S.R. Bowman and B.J. Feldman. 298

Recombination processes of rare earth bound excitons
M. Godlewski, K. Świątek and B. Monemar. 303

Non-radiative fast processes and quantum efficiency of transition metal ions in solids
M. Grinberg and A. Mandelis 307

Persistent optical coherence loss by UV irradiation in Pr^{3+}:YAG
K.W. Jang, R.S. Meltzer and J. Ganem. 311

Fluorescence line narrowing in erbium-doped silica fibers
A.M. Jurdyc, B. Jacquier, J.C. Gâcon, J.F. Bayon and E. Delevaque. 316

Singlet exciton dynamics of guest impurities in molecular crystals
A. Krüger, C. Kryschi, D. Schmid and H.-P. Trommsdorff 321

Excitation migration in Cr-doped fosterite crystals
H. Liu, W. Jia, C.L. Porter and R.J. Reeves 324

Bivibron line widths in solid deuterium at high pressure
J.H. Eggert, H.-k. Mao and R.J. Hemley 328

Zeeman dependence of optical/RF double resonances in the C_{4v} centre CaF_2:Ho^{3+}
J.P.D. Martin, T. Boonyarith and N.B. Manson 332

Time-resolved measurements of excitation spectra for intrinsic emission in alkali iodides
T. Matsumoto, A. Miyamoto, K. Ichinose, A. Ohnishi, K. Kan'no and T. Hayashi 335

Excited-state absorption of Eu^{2+} ions in pure fluoride crystals
B. Moine, C. Dujardin and C. Pedrini 339

Interband and intraband exciton scattering in coronene crystal
S. Nakatani, T. Nakamura, K. Mizuno and A.H. Matsui 343

Effects of uniaxial stress on self-trapped excitons in RbI
H. Nishimura, T. Tsujimoto, S. Morimoto and M. Nakayama 347

Optical spectroscopy of Pd^{2+}-doped $CsMgCl_3$ and $CsCdCl_3$
U. Oetliker and H.-U. Güdel. 350

Quantum efficiency measurement in solids by photoacoustic and luminescence experiments
E. Rodríguez, L. Núñez, J.O. Tocho and F. Cussó 353

Energy transfer between lanthanide ions in elpasolite lattices: electric quadrupole–electric quadrupole interaction
M. Chua, P.A. Tanner and M.F. Reid 356

Decay of fluorescence from phonon-assisted optical transitions in $CsMnCl_3 \cdot 2D_2O:Co^{2+}$
H. Wu, W.M. Dennis, W.M. Yen, W. Jia and D.L. Huber 361

Analysis of energy up-conversion in disordered solids
G.K. Liu and X. Wu 365

Intersystem-crossing, momentum relaxation and self-trapping of excitons in alkali iodides
T. Tsujibayashi, K. Toyoda, T. Hayashi, M. Watanabe, P. Gu and K. Kan'no 368

Excimer formation in molecular crystals
V.I. Yudson, H. Däubler and P. Reineker 371

Anomalous optical dephasing in crystalline $Y_2O_3:\rho Eu^{3+}$
G.P. Flinn, K.W. Jang, J. Ganem, M.L. Jones, R.S. Meltzer and R.M. Macfarlane 374

Subwavelength spectroscopy, exciton supertips and mesoscopic light-matter interactions
R. Kopelman, W. Tan and D. Birnbaum 380

Influence of OH^- impurities on the relaxation of F centers studied with picosecond optical pulses
M. Leblans, E. Gustin, A. Bouwen and D. Schoemaker 388

Nonlinear optical response of $(AB)_x$ chains
F.C. Spano 392

Nonlinear refraction and optical bistability in $Cd_{1-x}Mn_xTe$
A. Suchocki, L. Kowalczyk and R.R. Gałązka 396

A new principle of optical diagnostics of broken time reversibility in solids using unpolarized light
Yu.P. Svirko and N.I. Zheludev 399

Frozen core effects on nonexponential photon echo decay in ruby at high fields
A. Szabo 403

A prototype of a non-equilibrium open system: a microscopic laser theory
C. Uchiyama and F. Shibata 406

Infrared four-wave-mixing interferometry
A. Zilian, M.J. LaBuda, J.P. Hamilton, P.C. Chen and J.C. Wright 410

Nonclassical crossovers in binary reactions in one-dimensional systems
P. Argyrakis, R. Kopelman and K. Lindenberg 413

Author index 417

Subject index 423

Materials index 427